

Giving Language Learners the AffeX Factor: Developing an Affect Intelligent Foreign Language Learning Community

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Abstract: We report work in progress on the development of a quasi-immersive foreign language learning environment. The project will investigate how the resources within a learning context might be adapted to meet the affective and cognitive needs of language learners. Affect plays an important role in the probable success of a language learner, since language learning is inherently a social process. Without motivation or control of negative affective states (e.g. overwhelming anxiety or low self-esteem), language learners, regardless of their natural aptitude for languages, will not succeed. The theoretical framework for this project stems from Vygotsky's social constructivism, in which the development of an individual is dependant upon the quality of social interactions the learner has within the learning context. In response to this belief, it is the appropriate resources that should be adapted to meet the needs of the learners, rather than elements of the learning dialogue.

Keywords: Affect, social constructivism, scaffolding, ecology of resources

1 Introduction

A number of research studies have investigated the links between cognition and affect [1-3] with the result that the boundaries originally placed between cognitive and emotional developmental processes are eroding. Damasio, for example, has published evidence which indicates that cognition and emotion do not work in opposition to each other; instead they work together to govern our behaviour as people and as learners [1].

Although it is agreed that affect is an important component in all learning activities, affect has particular resonance in the process of learning a foreign language.

Unlike most other subjects, social interaction is a crucial feature of foreign language learning. One has to interact with others in a language learning environment if they are to become somewhat competent at using the language. It can be proposed therefore that due to the social nature of language learning, affect is by definition particularly important to the process of learning a foreign language.

Furthermore, the ability of an individual to embrace the culture and identity belonging to the target language is vital if the learner wishes to become competent. The sense of self needs to be stretched in order to accommodate the new self who speaks another language and who in some way identifies with another culture [4,5]. For some, the

process of developing another persona is inherently exciting. For others, this process can be deeply threatening to their beliefs about their own identity and culture [6].

The classic goals of an ITS is to provide intelligent learning interactions between itself and the learner with the goal of furthering the knowledge a learner has about a particular domain. A number of ILEs and ITSs have incorporated an affective model in order to make decisions based not only on the supposed cognitive abilities of the learner, but also their proposed affective state [7-10].

Methods for diagnosing the affective states of the learners range from using measurements of effort, confidence, independence and help seeking behaviour [8] to biological measurements such as body temperature, voice levels and blood pressure [7].

In comparison with human affect diagnosis, (where we determine the affective state of another through an examination of their beliefs, goals and preferences as well as through the external cues mentioned above [7]) ITSs diagnose affect in a simplified manner, based on what measurements the system can establish from its interactions with the learner. Some [11] may argue that these simplifications can result in the affective states of a learner being wrongly diagnosed resulting in a system which could distract or, worse still, irritate and alienate the learner. However, since the learning interactions fostered between an ITS and a learner are somewhat artificial, it is more than probable that a system which artificially and occasionally incorrectly responds to the affect of the learner will not be as distracting for the learner when compared with an occasion where a human incorrectly diagnoses and inappropriately responds to the affective state of another individual.

In this project the learning interactions will occur between the learners, this ITS will instead support the affective and cognitive interactions that take place between the foreign language learners. Therefore, rather than diagnosing the affective states of the learners through measures of effort, confidence, or biological changes, it will use the evaluations learners make of their own and their partners' affective states.

This project will investigate how the resources within a language learning community might be adapted to meet the affective and cognitive needs of its learners as well as how the resources can work to support learners as they adapt to meet their own needs.

The community will comprise of two sets of students, a first set based in Britain whose native language is English and a second set based in Germany whose native language is German.

The main research questions are as follows:

1. How should resources within an environment be highlighted to users so that they can adapt them to meet their learning needs?
2. How and when should a learner be supported so that they can adapt to meet their own cognitive and affective needs?
3. How does explicit knowledge of an individual's affective state affect the way pairs or groups of learners interact with one another?
4. What is the role of technology in supporting friendship and trust building processes?

The remainder of the paper will discuss the arguments for adapting the resources within a learning environment in reaction to the affective state of learners, which resources should be provided to language learners within this type of community and finally preliminary ideas about how the environment might respond to the affective states of its learners.

2 Why Adapt Resources?

The social constructivist theories of Vygotsky [12,13] prove potent when applied to foreign language learning since the framework emphasizes the importance of language in the transmission of culture and development.

The social constructivist approach is based upon the principle that an individual's learning and development is a result of their interactions within their learning context. The context, which can be defined as an ecology of resources [14], therefore shapes what the learner learns and how the learner develops.

As learners interact with their environment the external learning activities, which are contextualised by the culture of the learning environment, are internalised leading to the development of processes within the mind. The emerging psychological functioning of the individual is therefore a product of the culture and context in which they were developed [15].

Different contexts will result in different interactions between the individuals within the context and therefore different processes will be learnt and developed [14].

The theories of social constructivism have been incorporated into a number of ITSs and ILEs [8-10,16,17].

Vygotsky [13] provides the notions of the Zone of Proximal Development (ZPD) and mediation to define the way in which an individual can optimally interact with others within an environment in order for learning and development to arise.

A learner's ZPD refers to the level of skill or ability that the learner can reach when working with a more able partner. In other words it describes the mental functions of an individual which are in development but have not yet matured [13].

When a more able partner interacts with a learner within the space of the learner's ZPD they are working at a level just beyond what the learner can do on their own. It is interactions within this space that prove most fruitful in terms of development and learning outcomes.

The more able partner mediates the learner's interactions within the ZPD by shaping and selecting the learning episodes the learner experiences through providing the appropriate tasks and assistance as well as ensuring the context contains the necessary resources. The concept of mediation has been formalised into a teaching strategy known as scaffolding [18] which has been implemented in a number of ITSs and ILEs [8,9,16,17].

In accordance with this theory it is the whole context and therefore the ecology of resources that the context comprises which affect how and what an individual learns. When a learner is struggling cognitively or affectively with a particular learning experience a number of resources within the environment should therefore be adapted or seek to support the learner as he or she adapts to the experience.

The learning community this project will focus on is made up of both native English speakers learning German and native German speakers learning English, the interactions between the two sets of students leads to a novel aspect of ZPD support. At certain points in the interactions the English speaking students will be the more able partners guiding their German collaborators through the process of learning English. At other times they will be the less able partners being guided through the process of learning German. This results in what could be termed a pendulum-like ZPD, which swings between the two ZPDs of the collaborative pair, depending on the language in which the interaction is occurring. This pendulum-like ZPD results in an initial hypothesis that the students' experiences of both scaffolding and being scaffolded will lead them to a more affective understanding of the language learning process. The increased affective understanding of the group is expected to lead to greater opportunities for trust building and friendship forming processes resulting in increased learning gains.

3 What Should Belong in the Ecology of Resources?

A number of the arguments outlined above promoted the integral role which the context and the organisation of a context play in the learning and development of an individual working within that context.

The aim of this project is to develop a quasi-immersive learning context, providing the motivational impacts of an immersive environment [4,19,20] whilst maintaining the relative safety of a classroom environment [2,6].

The following section will not exhaustively discuss all the resources that will be made available to the learners interacting within the language learning environment proposed by this paper. It will instead examine three resources which are of utmost importance to the goal of providing a quasi-immersive context which motivates but maintains a feeling of safety for the learners working within it. These are *scaffolding support, friendship and trust building mechanisms* and *a message conveying system*.

3.1 Scaffold Support

It is important that the scaffolding interactions between the more and less able partner are choreographed in such a way that they support the learner both affectively and cognitively.

In terms of affect, the more able partner plays an important role in continuing to encourage a student through the arduous and sometimes thankless task of learning a foreign language.

In terms of cognition, the scaffolder's task of organising resources, providing appropriate assistance and suitable learning interactions is paramount to the social experience that the learner internalises, and therefore the resulting development and learning [14].

Since the task of scaffolding is likely to be difficult for most novice scaffolders, the environment will provide members of the community with a hand-held device which will make support available to them. For scaffolders, this could be a list of resources within the environment that might be useful for the task they are tackling with their less able partner, advice about how the resources available in the context might be used to

best effect, the level of language competence their partner has, information about the skills the less able partner needs to develop further as well as advice about how to correct errors.

3.2 Making Friends and Building Trust at a Distance

In order for a learner to be able to learn in a learning community they must feel safe [21]. Immersive learning contexts are by definition an environment where a participant’s feelings of safety may be threatened. Participants may feel that their language mistakes are more salient and they may not be able to take the risks necessary to learn the foreign language [22].

Through paying attention to group dynamics [5] a community can be developed where its members support one another, trust one another, are tolerant of every member of the group and have a positive sense of being part of a group [23]. However, a group with dynamics such as these does not generally surface without support.

A number of projects have set up text-based forums or email exchanges between two sets of university students wishing to learn one another’s languages [24,25]. These studies show the natural progression of textual conversation between language learning students when there is no attention paid to the group’s dynamics. The conversational excerpts display symptoms of a group whose dynamics haven’t evolved far enough to be fully supportive of the language learning process. For example, members of the group miss online sessions, fail to complete assignments and correct mistakes in a way that may cause anxiety or humiliation.

Some researchers have become interested in the role of group dynamics within physical language learning classrooms [5,26,27] but little attention has been paid to the process of developing group dynamics within virtual classrooms. This project will look at the role of tactile, video and audio technologies in the development of group processes within a virtual space.

3.3 Conveying Self Identity and Messages When the Words Aren’t There

The learners, particularly those of low level language competence, will feel anxious about not being able to convey messages as well as they could in their native language, this may result in language shyness (students unwilling to communicate within the class) [6].

The researchers propose that one method in which this situation can be avoided is to provide the learners with alternative (non-verbal) methods of communicating. These resources could take the form of shared drawing tablets, symbol or sign systems.

4 How Should Affect Be Responded to?

It is intended that the system will use information from the pedagogical framework, user model, as well as the learner’s perceived or reported affective states to decide in what way the resources within the environment should adapt to support the needs of the learner or how the learner should be supported as they adapt to meet their own needs.



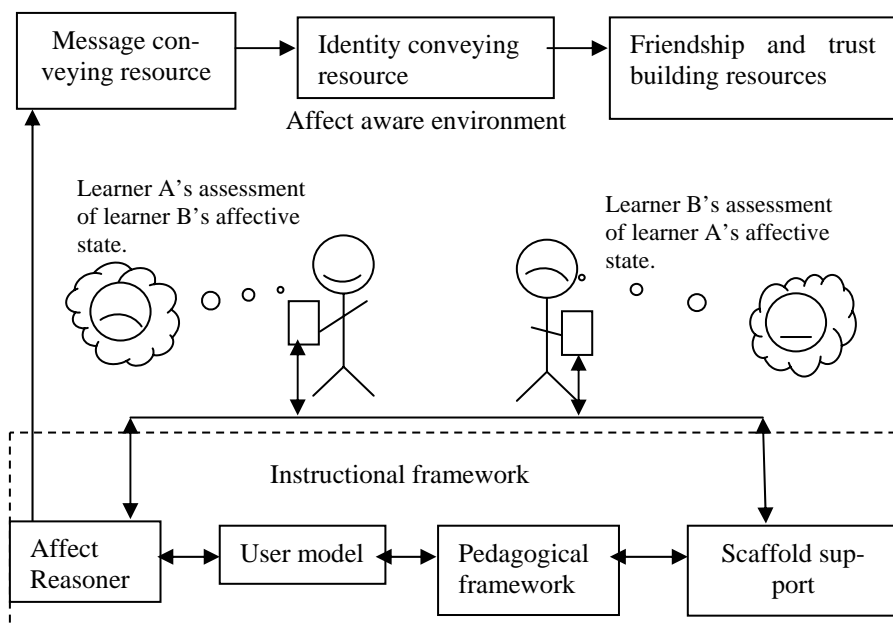


Fig 1: A diagram showing the information flow in the affective decision making system.

The above diagram shows learner A and learner B working together using learner A's native language. Learner A has been sent information from the scaffold support resource about Learner B's language ability, a number of tasks that may be suitable for learner B's competence level and a list of resources that may be helpful in supporting the learning interactions. During the interaction learner A senses that learner B is struggling and beginning to withdraw (learner A might think this because learner B is only answering questions with short or one word answers, learner B has a slumped posture or because learner B is doodling on her note pad). Learner A then sends a report through his hand-held device to the affect reasoner giving his perception of learner B's affective state (this report may take the form of a selection of key words or images describing affective states). A few moments later learner B sends a message to the affect reasoner saying that she feels anxious. The affect reasoner works with the user model and the pedagogical framework to decide how the environment should react to the situation. The reaction could include changes such as sending further scaffolding support to learner A advising that he use simpler language and make more use of the message conveying resource. Learner B may be sent some key vocabulary to help her understand and converse with increased confidence. The system could also provide access to friendship or trust building technology or ask the pair to collaborate with another pair of learners.

5 Conclusions

The aim of this project is to develop a language learning environment which adapts to meet the cognitive and affective needs of the learner as well as supporting the learner in their adaptations to meet their own needs.

This paper has provided an insight into this work in progress through an overview of the theoretical framework, preliminary ideas about what types of resources might need to be available and how the learning environment might adapt to support the needs of its learners.

With the theoretical framework in place, the project will shortly move towards the design phase, which will be an iterative process based on user centred design techniques. Once a working prototype is developed, the language learning community will be set up for use over a number of weeks in order to evaluate the potential usefulness of such a community.

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